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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/652,248
Filing Date: August 29, 2003
Appellant(s): NELSON ET AL.

Mark A. Hixon
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 6, 2007 appealing from the Office action mailed November 6, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is incorrect. The opening sentence incorrectly states "the final rejection of claims 1-12". It should instead state "the final rejection of claims 1, 3-9 and 13-24.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: Item B should read as Claims 1, 3-9, and 13-24 were rejected under 35 USC §103 as being unpatentable over US 5,798,142 to Soubeyrand in view of US 6,818,250 to George and US 5,432,707 to Dick.

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

Claims 16, 18, and 21-23 were rejected under 35 USC §102(b) as anticipated by US 5,432,707 to Dick et al.

Claims 17, 19, 20 and 24 were rejected under 35 USC §103 as being unpatentable over US 5,432,707 to Dick in view of US 5,798,142 to Soubeyrand.

(7) Claims Appendix

A substantially correct copy of appealed claim 16 appears on page 19 of the Appendix to the appellant's brief. The minor errors are as follows: In step b, "comprising a silane, ammonia, oxygen and an inert carrier gas" has been deleted in the amendment filed September 6, 2006.

(8) Evidence Relied Upon

The evidence relied upon by the examiner in the rejection of the claims under appeal includes:

US 5,798,142 to Soubeyrand on August 25, 1998

US 6,818,250 to George et al on November 16, 2004

US 5,431,707 to Dick et al on July 11,1995

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

A) Claims 1, 3-9, and 13-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soubeyrand (5,798,142) in view of George et al. (6,818,250) and Dick et al. (5,431,707). Regarding claims 1-5, 7-8, 16-20, and 22-23, Soubeyrand

discloses a process comprising providing a heated glass substrate having a surface for depositing a coating, forming a precursor mixture comprising a ethylene, monosilane, oxygen and nitrogen and then directing the precursor mixture along the surface to be coated, and reacting the mixture at or near the surface to form a silica coating on the surface of the glass substrate (abstract, col. 2 lines 24-57, col. 5 lines 63-65). However, Soubeyrand fails to disclose the use of ammonia as one of the precursors. George et al. teach a vapor deposition process for coating glass with a silica layer comprising ammonia (col.1 lines 25-65, col. 2 lines 39-49). George et al. further teach that ammonia is preferred on the basis of catalytic activity and ease of use (col. 3 lines 37-39). Dick et al. also teach the use of ammonia in a precursor mixture comprising monosilane, oxygen, and nitrogen, for the coating of a heated glass surface. Dick et al. also mention using ammonia to ensure a dense and homogenous silicon base layer (col. 1 line 28 to col. 2 line 7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize ammonia in the process of Soubeyrand because of its catalytic nature for attaching silica layers on silica substrates and for its role in contributing to the thickness of the silica layer formed, as taught by George et al.

Regarding claims 6 and 21, Dick et al. disclose forming a homogenous silicon layer and indicate essentially no nitrogen in the silica layer (col. 2 lines 2-3, 12-16). George et al. also teach of a resultant coating on the glass substrate with no nitrogen content (col. 6 lines 11-14, col. 9 lines 12-15, col. 11 lines 11-13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have no nitrogen in the coating layer on the glass substrate of Soubeyrand to prevent the poison

of the SiO_2 surface and degradation of the SiO_2 CVD reaction efficiency, as taught by George et al.

Regarding claims 9, 13, and 24, Soubeyrand teaches a silane concentration of 1.0%, oxygen concentration of 5% and an ethylene to silane ratio of 6 to 1 in experiment no. 2 in Table I. With 1% silane, as disclosed by Soubeyrand, the ethylene concentration would be 6-9%. However, Soubeyrand fails to disclose an ammonia concentration. Dick et al. also disclose a similar precursor mixture containing ammonia, comprising, 1% silane, 4 % oxygen, 50% ammonia, and the balance the inert carrier gas (col. 2 line 46). George et al. do not specifically teach a concentration of ammonia in percentages, but do teach controlling the pressure of ammonia use during the coating of the glass substrate and how it contributes to the thickness of the silica film formed (col. 6 line 30 to col. 7 line 47). Although the ammonia concentrations of Dick et al. or George et al. are not 15%, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the concentration of the ammonia gas in the precursor mixture of Soubeyrand, given the same precursor materials are used and to achieve an optimum thickness of the silica layer, as taught by George et al.

Regarding claim 14, Soubeyrand discloses premixing the precursor materials to form a precursor mixture before directing the mixture (col. 2 lines 35-38). Dick et al. also disclose a similar step with the precursor materials (col. 1 lines 52-55).

Regarding claim 15, Soubeyrand discloses cooling the coated glass to ambient temperature in a cooling section (22) following deposition (68) (col. 3 lines 43-45, col. 1 lines 35-36).

(10) Response to Argument

Rejection of Claims 1-9, 13-14 and 16-24 under 35 USC §103 as being unpatentable over US 5,798,142 to Soubeyrand in view of US 6,818,250 to George and US 5,432,707 to Dick.

The applicant argues that unexpected benefits result from the addition of both the radical scavenger and the ammonia to achieve a peak thickness, as supported in the specification. The Examiner would also like to point out that the specification also mentions that the radical scavenger and ammonia affects the reaction profile, forcing the reaction to take place over the entire coater face rather than under the nozzle, leading to a large decrease in pre-reaction powder formation and increased manufacturing efficiencies/thickness in paragraphs [0018]-[0019]. The Examiner disagrees that unexpected benefits are achieved. Soubeyrand discusses a similar concern, wherein a certain thickness of the silica coating is desired in col. 2 lines 1-15. Furthermore, Soubeyrand teaches a similar benefit as the applicant, wherein the ethylene prevents the reaction from occurring when the gas mixture is below a certain temperature threshold and contributes to the control of and permits optimization of the kinetics of the chemical vapor deposition reaction in col. 2 lines 43-54, specifically the rate of reaction can be controlled to spread the reaction over the entire coating area beneath the gas distributor beam; as a result, both the deposition rate and coating uniformity can be maximized (col. 4 lines 54-57). Soubeyrand also teaches that the ethylene inhibit premature ignition of the precursor materials as well as control the kinetics of the chemical vapor deposition reaction in col. 5 lines 42-50. Similarly, Dick

briefly mentions the benefit of utilizing ammonia in the coating of a silica layer, which is to guarantee a dense and homogenous silicon layer (col. 2 lines 1-3). It is clear that the achievement of peak thickness by increasing efficiency and homogenous deposition of the precursors mixture by utilizing ammonia and ethylene is not an unexpected benefit.

In response to the applicant's argument with respect to the prior art of George, where the applicant points to an embodiment of the deposition process of George, more specifically layers of materials are sequentially applied, the applicant already points to col. 4 lines 5-20, where some premixing has occurred. In addition, George discloses the chemical vapor deposition process includes the simultaneous addition of the precursor materials so that some mixing occurs in the vapor phase in col. 3 lines 59-62. Also, Soubeyrand has already taught premixing the mixture and the prior art of George was used to teach the use of ammonia. Therefore, applicant's argument that the reactants are not premixed is incorrect.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., references do not exclude the presence of nitrogen in the layer) are not recited in the rejected claims 1 or 16. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The applicant's argues the prior art of Dick refers to a glass receptacle application and that the gaseous mixture is projected in an ambient atmosphere, and that it differs from the on-line float glass production process claimed in claim 16. The

Examiner would like to point out that Dick was used to teach the deposition of a silicon layer on a heated glass substrate, with emphasis on the use of ammonia, and not for the glass receptacle production process. Furthermore, Soubeyrand discloses the claimed coating method in an on-line float glass production process already, and that the coating process can be applied in the annealing lehr of an on-line float glass production process, wherein the atmosphere of the annealing lehr is atmospheric air (col. 3 lines 43-45, col. 4 lines 6-10). Lastly, Soubeyrand discloses a possible source of oxygen in the precursor mixture can be atmospheric air, which is generally compatible with float bath atmosphere in col. 5 lines 57-62. Therefore, the application of the Dick reference is not different from the on-line float glass production process.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

QSD August 15, 2007

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